

REMARKS

Applicant appreciates the thorough examination of the present application that is reflected in the Office Action of June 25, 2007.

Claims 1-73 are pending. Claims 1-3, 10-14, 17, 18, 23-26, 31-33, 39-43, 49-52, 56, 57, 63-65, 68, and 71-73 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Publication No. 2003/0045307 to Arviv et al. (“Arviv”). Claim 69 stands rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Publication No. 2004/0266339 to Larsson. Claims 4-9, 15, 16, 19-22, 27-30, 34-38, 44-48, 53-55, 58-62, 66 and 67 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Arviv in view of U.S. Patent No. 6,411,824 to Eidson. Claim 70 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Larsson in view of Arviv.

In response, Claims 64-68 have been amended, Claims 69-73 have been cancelled, and New Claims 74-81 have been added. No new matter has been added. Applicant respectfully requests reconsideration of the rejections of the remaining claims for the reasons that will now be described.

A. The Independent Claims are Patentable Over the Cited Art

Claim 1 recites as follows (emphasis added):

1. A wireless communication method comprising:
transmitting wireless communications from at least two radioterminals to a base station co-channel over a return link using a return link alphabet; and
transmitting wireless communications from the base station to the at least two radioterminals over a forward link using a forward link alphabet that has more symbols than the return link alphabet.

Accordingly, Claim 1 recites transmitting wireless communications from at least two radioterminals to a base station co-channel over a return link using a return link alphabet. The Office Action contends that Arviv discloses transmitting wireless communications from at least two radioterminals to a base station co-channel over a return link using a return link alphabet, citing Figure 6a and paragraphs 54 and 55 of Arviv. Office Action, page 3.

Applicant has studied the cited portions of Arviv, and respectfully submits that the cited portions of Arviv do not teach or suggest at least “transmitting wireless communications from at least two radioterminals to a base station co-channel over a return link” as recited in Claim 1.

In particular, the cited paragraphs of Arviv discuss the transmission and reception of uplink and downlink signals by customer premises equipment (CPE) 104(a)-(c) in a radio communication system during a time frame. Arviv, para. [0054]-[0055]. However, as illustrated in Figure 3 of Arviv, the uplink transmissions by the various CPE 104(a)-(c) are not co-channel. Rather, the transmissions are provided in separate time domain multiplexed channels. Figure 3 of Arviv is reproduced below for the Examiner's convenience.

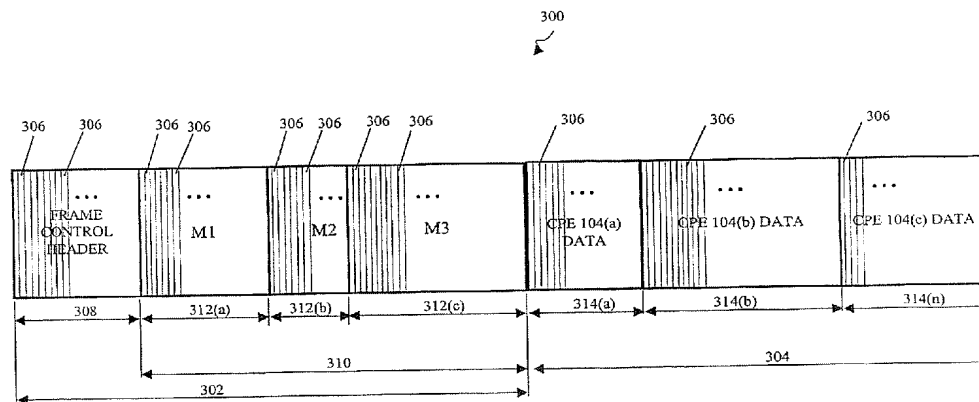


FIGURE 3

As explained in Arviv, each CPE 104(a)-(c) transmits during its assigned physical layer slots (PSs) 306:

[0046] Still referring to FIG. 3, the uplink subframe 304 comprises uplink data 314(a)-(n). The uplink subframe 304 is used by the CPEs 104(a)-(c) to transmit information to the base station 102. The subframe 304 is subdivided into a plurality of PSs 306. Each CPE 104(a)-(c) transmits its information during its allocated PS 306 or range of PSs 306. In one embodiment, the PSs 306 allocated for each CPE are grouped into a contiguous block of a plurality of data blocks 314(a)-(n). In this embodiment, the CPEs use data blocks 314(a)-(n) to transmit the uplink subframe 304. The range of PSs 306 allocated to each block in the plurality of data blocks 314(a)-(n) is selected by the base station 102. (emphasis added)

Arviv, para. [0046]. Accordingly, transmissions by the CPE 104(a)-(c) of Arviv are not co-channel, as recited in Claim 1. While co-channel interference can occur, the transmissions of Arviv themselves are not co-channel transmissions. As explained in the present Specification:

As used herein, the term "co-channel" indicates signals that overlap in time and space, and that use the same carrier frequency, the same time slot if the signals are Time Division Multiple Access (TDMA) signals, and the same spreading code if the signals are Code Division Multiple Access (CDMA) signals, such that the two signals collide at a receiver.

Specification, page 2, lines 30-34. Since communications to and from the CPE 104(a)-(c) of Arviv utilize different physical layer slots 306 of a frame, the communications of Arviv are not co-channel as defined in the present specification and as used in Claim 1.

Arviv fails to teach or suggest each and every recitation of Claim 1. Accordingly, Applicant respectfully requests withdrawal of the rejection of Claim 1 as anticipated by Arviv.

Claim 12 is likewise not anticipated by Arviv. Claim 12 recites as follows (emphasis added):

12. A wireless communication method comprising:
transmitting wireless communications from at least two radioterminals to a base station over a return link using a return link alphabet; and
transmitting wireless communications from the base station to the at least two radioterminals co-channel over a forward link using a forward link alphabet that has more symbols than the return link alphabet.

Accordingly, Claim 12 recites transmitting wireless communications from the base station to the at least two radioterminals co-channel over a forward link. The Office Action asserts that Arviv discloses transmitting wireless communications from a base station to at least two radio terminals co-channel over a forward link, citing Arviv Figure 6a and paragraphs [0026], [0054] and [0055]. Office Action, pages 4-5.

None of the cited passages of Arviv discusses co-channel transmissions from a base station to at least two radioterminals. Paragraph [0026] of Arviv simply discusses quality of service issues, while paragraphs [0054] and [0055] of Arviv discuss the transmission and reception of uplink and downlink signals by CPE 104(a)-(c) in a radio communication system during a time frame.

In contrast to the claimed co-channel forward link transmissions, Arviv discloses transmitting downlink (i.e., forward link) transmissions to the respective CPE 104(a)-(c) on different timeslots as follows:

[0045] The downlink data 310 is transmitted in a pre-defined modulation or a sequence of modulation techniques M1, M2, M3. Individual or groups of PSs 306 in the downlink subframe 302 are assigned to data intended for specific CPEs 104. For example, the base station 102 could assign PSs in one, some, or all of the modulation techniques M1, M2, M3 for transmitting data to CPE 104(a). In FIG. 3, the data is divided into three modulation types, where QPSK (312(a)) is the most robust modulation (i.e. least prone to transmission errors caused by signal interference) and while QAM-64 (312(c)) is the least robust (i.e. most prone to transmission errors caused by signal interference). In between these modulation schemes is QAM-32 (312(b)). In one embodiment, a sequence such as: QAM-4, followed by QAM-16, followed by QAM-64 is used. In other embodiments, additional modulation schemes, such as QAM-256, are used. Each CPE 104 monitors the downlink data 310 and retains only those messages intended for them. As mentioned above, in one embodiment, attributes in the frame control header 308 provide this information to the CPEs. (emphasis added)

Arviv, para. [0045]. Thus, in the system of Arviv, individual or groups of PSs 306 in the downlink subframe 302 are assigned to data intended for specific CPEs 104. That is, different time division multiplexed channels (comprising assigned PSs 306) are used for wireless communications with different CPEs 104. Therefore, Arviv does not teach or suggest at least "transmitting wireless communications from the base station to the at least two radioterminals co-channel over a forward link" as recited in Claim 12.

Arviv therefore fails to teach or suggest each and every recitation of Claim 12. Accordingly, Applicant respectfully requests withdrawal of the rejection of Claim 12 as anticipated by Arviv.

Similarly, Claim 24 is not anticipated by Arviv. Claim 24 recites as follows, as amended (emphasis added):

24. A wireless communication method comprising:
receiving wireless communications from a base station at a first radioterminal and at least one second radioterminal that is proximate the first radioterminal, over a forward link, co-channel;
relaying the wireless communications from the at least one second radioterminal to the first radioterminal over a short-range wireless link; and
using the wireless communications that are relayed to the first radioterminal from the at least one second terminal over the short-range wireless link to process the wireless communications that are received from the base station at the first radioterminal.

Applicant submits that Arviv fails to teach or suggest at least the underlined recitations of Claim 24. For example, as explained above, Arviv does not teach or suggest

receiving co-channel, forward link wireless communications from a base station at a first radioterminal and at least one second radioterminal.

The Office Action contends that Arviv discloses relaying the wireless communications from the at least one second radioterminal to the first radioterminal over a short-range wireless link, and using the wireless communications that are relayed to the first radioterminal from the at least one second radioterminal over the short-range wireless link to process the wireless communications that are received from the base station at the first radioterminal, citing Arviv Figure 6a and paragraphs [0026], [0054] and [0055]. Office Action, page 7. As discussed above, Arviv paragraph [0026] simply discusses quality of service issues, while paragraphs [0054] and [0055] of Arviv discuss the transmission and reception of uplink and downlink signals by CPE 104(a)-(c) in a radio communication system during a time frame. None of the cited passages of Arviv discusses relaying the wireless communications from the at least one second radioterminal to the first radioterminal over a short-range wireless link, much less using the wireless communications that are relayed to the first radioterminal from the at least one second radioterminal over the short-range wireless link to process the wireless communications that are received from the base station at the first radioterminal, as recited in Claim 24.

Moreover, Figure 6a of Arviv does not support the rejection of Claim 24. Figure 6a of Arviv is reproduced below for the Examiner's convenience. Figure 6a does not indicate that any communications occur between the respective CPEs 104, much less relaying communications from one CPE 104 to another, or using the relayed communications to process communications received from the base station, as recited in Claim 24.

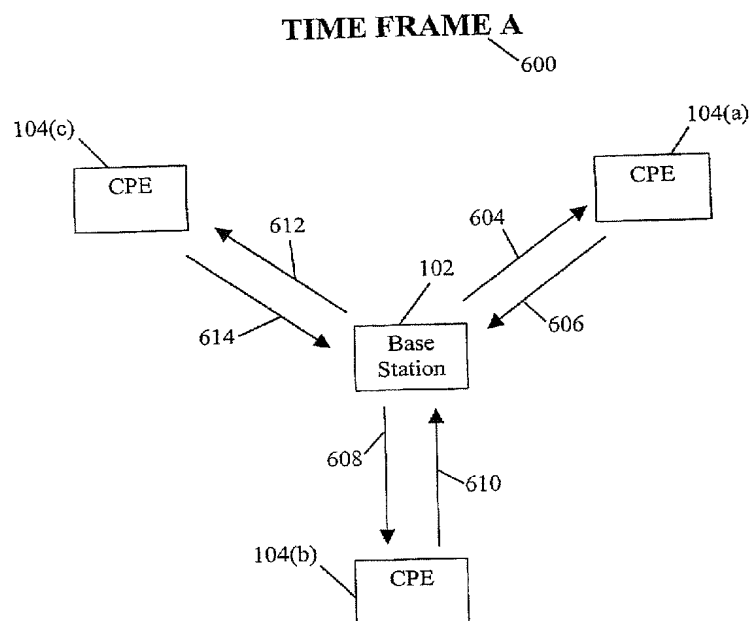


FIGURE 6A

Arviv therefore fails to teach or suggest each and every recitation of Claim 24. Accordingly, Applicant respectfully requests withdrawal of the rejection of Claim 24 as anticipated by Arviv.

Claim 31 is also not anticipated by Arviv. Claim 31 recites as follows (emphasis added):

31. A wireless communication method comprising:
bidirectionally transmitting wireless communications co-channel in time division duplex from at least two radioterminals to a base station over a return link using a return link alphabet and from the base station to the at least two radioterminals over a forward link using a forward link alphabet that has more symbols than the return link alphabet.

Applicant submits that Arviv fails to teach or suggest at least the underlined recitations of Claim 31. For example, as explained above with respect to Claim 1, Arviv does not teach or suggest transmitting co-channel, return link wireless communications from at least two radioterminals to a base station. Furthermore, as explained above with respect to Claim 12, Arviv does not teach or suggest transmitting co-channel, forward link wireless communications from a base station to at least two radioterminals. Therefore, Arviv does not teach or suggest bidirectionally transmitting wireless communications co-channel in time

division duplex from at least two radioterminals to a base station over a return link using a return link alphabet and from the base station to the at least two radioterminals over a forward link, as recited in Claim 31.

Arviv therefore fails to teach or suggest each and every recitation of Claim 31. Accordingly, Applicant respectfully requests withdrawal of the rejection of Claim 31 as anticipated by Arviv.

Claim 41 is also not anticipated by Arviv. Claim 41 recites a base station comprising a receiver that is configured to receive wireless communications from at least two radioterminals co-channel over a return link. Claim 41 is therefore patentable over Arviv for at least similar reasons as described above with respect to Claim 1, which will not be repeated for brevity. As Arviv fails to teach or suggest each and every recitation of Claim 41, Applicant respectfully requests withdrawal of the rejection of Claim 41 as anticipated by Arviv.

Likewise, Claim 49 is also not anticipated by Arviv. Claim 49 recites base station comprising a transmitter that is configured to transmit wireless communications to at least two radioterminals co-channel over a forward link. Claim 49 is therefore patentable over Arviv for at least similar reasons as described above with respect to Claim 12, which will not be repeated for brevity. As Arviv fails to teach or suggest each and every recitation of Claim 49, Applicant respectfully requests withdrawal of the rejection of Claim 49 as anticipated by Arviv.

Claim 56 recites a base station comprising a time division duplex transceiver that is configured to receive wireless communications co-channel from at least two radioterminals over a return link. Claim 56 is therefore patentable over Arviv for at least similar reasons as described above with respect to Claim 1, which will not be repeated for brevity. As Arviv fails to teach or suggest each and every recitation of Claim 56, Applicant respectfully requests withdrawal of the rejection of Claim 56 as anticipated by Arviv.

Claim 64 has been amended to recite as follows:

64. A radioterminal comprising:
a transmitter that is configured to transmit wireless communications to a base station; and
a receiver that is configured to receive at least first and second signals, to process the at least first and second signals to derive first data that is associated with information transmitted by the base station to at least one device other than the radioterminal and to use the first data to derive second data that is associated with information transmitted by the base station to the radioterminal.

Claim 64 recites a radioterminal comprising a receiver that is configured to receive at least first and second signals. Furthermore, Claim 64 has been amended to recite that the receiver is configured to process the at least first and second signals to derive first data that is associated with information transmitted by the base station to at least one device other than the radioterminal and to use the first data to derive second data that is associated with information transmitted by the base station to the radioterminal. Applicant submits that these recitations are not taught or suggested by Arviv. Applicant therefore respectfully requests withdrawal of the rejection of Claim 64 as anticipated by Arviv.

Claim 69 was rejected as anticipated under 35 U.S.C. § 102(e) by Larsson. Applicant respectfully submits that Larsson is not prior art to the present application. In particular, Claim 69 is supported by U.S. Provisional Application Serial No. 60/473,959, entitled "Systems and Methods That Enable Co-Channel Communications With a Base Station of a Plurality of Radioterminals," filed May 28, 2003 (the "'959 Application"). The present application claims the benefit of the '959 Application.

Claim 69 recites as follows:

69. A radioterminal comprising:
a receiver that is configured to receive wireless communications from a base station over a forward link, to receive the wireless communications from at least one second radioterminal over a short-range wireless link, and to use the wireless communications that are received from the at least one second terminal over the short-range wireless link to process the wireless communications that are received from the base station.

The '959 Application discloses at page 3, lines 5-14:

In environments of dense radioterminal communications, such as in airports, convention centers, shopping malls, etc, one or more radioterminals that may be proximate to a first and/or second co-channel radioterminal may be configured to provide signals to the first and/or second receiving co-channel radioterminal, as illustrated in Figure 1c. These signals may be relayed from the one or more proximate radioterminals to the first and/or second receiving co-channel radioterminal via short-range wireless links. The first and/or second receiving co-channel radioterminals may be configured to process the signals received from the one or more proximate radioterminals so as to improve a quality measure (such as the Bit Error Rate (BER)) of the information that is being received from the BTS.

Accordingly, Applicant respectfully requests that the citation of Larsson be withdrawn, and that the rejection of Claim 69 be withdrawn.

B. The Dependent Claims are Patentable Over the Cited Art

Dependent Claims 2-11, 13-23, 25-30, 32-40, 42-48, 50-55, 57-63, and 65-68 are patentable at least per the patentability of the respective independent claims from which they depend. Moreover, many of the dependent claims are patentable over the cited references for additional reasons.

For example, Claim 5 recites "transmitting wireless communications from at least two radioterminals to a plurality of multiple-polarized antennas at the base station co-channel over a return link." Claim 5 was rejected as unpatentable over Arviv in view of Eidson. Office Action, pages 18-19. The Office Action concedes that Arviv fails to teach these recitations, but states that "Eidson teaches a base station using diversity reception wherein the signal from two or more mobiles are received by two or more polarized antenna arrays (Eidson see for example figure 2, column 5, line 49 - column 6, line 22." Office Action, page 19. While the cited portions of Eidson discuss transmitting wireless communications to a multiple-polarized antenna at a base station, they do not teach or suggest transmitting wireless communications to a plurality of multiple-polarized antennas, as recited in Claim 5.

Similarly, Claim 34 recites "bidirectionally transmitting wireless communications co-channel in time division duplex from at least two radioterminals to a plurality of multiple-polarized antennas at the base station," while Claim 45 recites a base station including a receiver that is "configured to receive wireless communications from at least two radioterminals co-channel over a return link using a return link alphabet at a plurality of multiple-polarized antennas," and Claim 59 recites a base station including a transceiver configured "transmit wireless communications to the at least two radioterminals over a forward link using a forward link alphabet that has more symbols than the return link alphabet at a plurality of multiple-polarized antennas." Claims 34, 45 and 59 are submitted to be patentable for similar reasons as Claim 5.

Claim 6 recites "transmitting wireless communications from at least two radioterminals to a plurality of multiple-polarized antennas in a sector of the base station." The Office Action states that the quoted recitations of Claim 6 are disclosed in Eidson at Figure 2, column 5, line 49 to column 6, line 22. Office Action, page 19. While Eidson

Figure 2 appears to show a sectored antenna 106, Eidson does not teach or suggest that a sector of the antenna includes multiple-polarized antennas, and therefore does not teach or suggest transmitting wireless communications from at least two radioterminals to a plurality of multiple-polarized antennas in a sector of the base station.

Similarly, Claim 29 recites "transmitting wireless communications from the first radioterminal and at least one second radioterminal to a plurality of multiple-polarized antennas in a sector of the base station," and Claim 35 recites "transmitting wireless communications co-channel in time division duplex from at least two radioterminals to a plurality of multiple-polarized antennas in a sector of the base station over a return link." Claim 46 recites a base station including a receiver that is "configured to receive wireless communications from at least two radioterminals co-channel over a return link using a return link alphabet at a plurality of multiple-polarized antennas in a sector of the base station," and Claim 60 recites a base station including a transceiver that is "transmit wireless communications to the at least two radioterminals over a forward link using a forward link alphabet that has more symbols than the return link alphabet at a plurality of multiple-polarized antennas in a sector." Claims 29, 35, 46 and 60 are submitted to be patentable for similar reasons as Claim 6.

Claim 7 recites "transmitting wireless communications from at least two radioterminals to at least one multiple-polarized antenna in at least two sectors of the base station." The Office Action states that the quoted recitations of Claim 7 are disclosed in Eidson at Figure 2, column 5, line 49 to column 6, line 22. Office Action, page 20. However, the cited portions of Eidson do not teach or suggest one multiple-polarized antenna in at least two sectors of the base station, and therefore does not teach or suggest transmitting wireless communications from at least two radioterminals to at least one multiple-polarized antenna in at least two sectors of the base station.

Similarly, Claim 36 recites "bidirectionally transmitting wireless communications co-channel in time division duplex from at least two radioterminals to at least one multiple-polarized antenna in at least two sectors of the base station over a return link," while Claim 47 recites a base station including a receiver that is "configured to receive wireless communications from at least two radioterminals co-channel over a return link using a return link alphabet at at least one multiple-polarized antenna in at least two sectors," while Claim 61 recites a base station including a transceiver that is configured to "transmit wireless

communications to the at least two radioterminals over a forward link using a forward link alphabet that has more symbols than the return link alphabet at at least one multiple-polarized antenna in at least two sectors." Claims 36, 47 and 61 are submitted to be patentable for similar reasons as Claim 7.

Claim 8 recites "transmitting wireless communications from at least two radioterminals to at least one multiple-polarized antenna at the first base station and at least one multiple-polarized antenna at a second base station." The Office Action states that the quoted recitations of Claim 8 are disclosed in Eidson at Figure 2, column 5, line 49 to column 6, line 22. Office Action, page 20. However, the cited portions of Eidson do not teach or suggest transmitting wireless communications from at least two radioterminals to at least one multiple-polarized antenna at the first base station and at least one multiple-polarized antenna at a second base station.

Similarly, Claim 37 recites "bidirectionally transmitting wireless communications co-channel in time division duplex from at least two radioterminals to at least one multiple-polarized antenna at the first base station and at least one multiple-polarized antenna at a second base station over a return link using a return link." Claim 37 is submitted to be patentable for similar reasons as Claim 8.

Claim 9 recites "selectively transmitting wireless communications from at least two radioterminals to a plurality of multiple-polarized antennas in a sector of the base station co-channel over a return link using a return link alphabet if the at least two radioterminals are separated by more than a predetermined distance." The Office Action states that the quoted recitations of Claim 9 are disclosed in Eidson at Figure 2, column 5, line 49 to column 6, line 22. Office Action, page 21. However, nothing in the cited references describes or suggests selectively transmitting wireless communications if the at least two radioterminals are separated by more than a predetermined distance.

Similarly, Claim 30 recites "transmitting wireless communications from the first radioterminal and at least one second radioterminal ... if the first radioterminal and the at least one second radioterminal are separated by more than a predetermined distance." Claim 38 recites "transmitting wireless communications co-channel in time division duplex from at least two radioterminals to a plurality of multiple-polarized antennas in a sector of the base station over a return link ... if the at least two radioterminals are separated by more than a predetermined distance." Claim 62 recites a base station including a transceiver "configured

to selectively receive wireless communications co-channel from at least two radioterminals to the plurality of multiple-polarized antennas in the sector over a return link using a return link alphabet if the at least two radioterminals are separated by more than a predetermined distance." Claims 30, 38 and 62 are submitted to be patentable for similar reasons as Claim 9.

Claim 15 recites "transmitting wireless communications from the base station to at least one multiple-polarized antenna at each of the at least two radioterminals co-channel over a forward link." The Office Action contends that "Eidson teaches a base station using diversity reception wherein the signal from two or more mobiles are received by two or more polarized antenna arrays." Office Action, page 21. Applicant respectfully notes that Claim 15 is directed to multiple-polarized antennas at the radioterminals, not at the base station. Eidson in fact expressly teaches away from providing multiple-polarized antennas at the downlink radioterminals: "Two-way polarization diversity can be implemented by building a handset unit with a polarization-diverse receiving antenna. Unfortunately, as discussed above, implementing antenna diversity in the handset unit is typically not practical due to problems related to cost, weight, size, and complexity." Eidson, column 5, lines 42-46. Accordingly, a skilled person would not modify Arviv in view of Eidson to transmit wireless communications from the base station to at least one multiple-polarized antenna at each of the at least two radioterminals co-channel over a forward link, as recited in Claim 15.

Similarly, Claim 16 recites "transmitting wireless communications from the base station to a plurality of multiple-polarized antennas at each of the at least two radioterminals co-channel over a forward link using a forward link." Claim 16 is submitted to be patentable for similar reasons as Claim 15.

C. The Newly Presented Claims Are Patentable

Applicant has presented new Claims 74-81, which depend from Claims 1, 12, 24, 31, 41, 49, 56 and 64, respectively.

New Claim 74 is dependent from Independent Claim 1 and recites "transmitting wireless communications signals that overlap in time and space, and that use the same carrier frequency, the same time slot if the signals are Time Division Multiple Access (TDMA) signals, and the same spreading code if the signals are Code Division Multiple Access (CDMA) signals, such that the wireless communication signals collide at a receiver."

New Claim 75 is dependent from Independent Claim 12 and includes similar recitations as new Claim 74.

New Claim 76 is dependent from Independent Claim 24 and recites "receiving wireless communications signals that overlap in time and space, and that use the same carrier frequency, the same time slot if the signals are Time Division Multiple Access (TDMA) signals, and the same spreading code if the signals are Code Division Multiple Access (CDMA) signals, such that the wireless communication signals collide at each of the first and second radioterminals."

New Claim 77 is dependent from Independent Claim 31, and recites "bidirectionally transmitting wireless communications signals that overlap in time and space, and that use the same carrier frequency, the same time slot if the signals are Time Division Multiple Access (TDMA) signals, and the same spreading code if the signals are Code Division Multiple Access (CDMA) signals, such that the wireless communication signals collide at a receiver."

New Claims 78-81 are dependent from Independent Claims 41, 49, 56 and 64, respectively, and include recitations similar to those in New Claims 74-77.

New Dependent Claims 82-134 are patentable at least per the patentability of the respective independent claims from which they depend.

D. The IDS Citation Should Be Considered

The Office Action stated that Citation #8 of the Information Disclosure Statement filed March 8, 2004, was not considered because it does not include a concise explanation of its relevance in English. Office Action, page 2. Applicant notes that the Citation includes an English language Abstract that provides concise explanation of its relevance in English. Accordingly, Applicant requests consideration of the Citation.

CONCLUSION

In light of the above remarks, Applicant respectfully submits that the above-entitled application is now in condition for allowance. Favorable reconsideration of this application, as amended, is respectfully requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "D. Hall", with a stylized flourish extending from the end.

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